

CLAIMS

WHAT IS CLAIMED IS:

1. A method for producing a three-dimensional object through solid freeform fabrication comprising:
selectively depositing a boundary structure, wherein said boundary structure defines a surface of said object; and
depositing a flowable build material within said boundary structure, wherein said flowable build material forms a portion of said object by flowing to said boundary structure.
2. The method of claim 1, further comprising planarizing said flowable build material.
3. The method of claim 1, further comprising solidifying said flowable build material.
4. The method of claim 3, wherein said solidifying comprises curing said flowable build material.
5. The method of claim 3, wherein said solidifying comprises chemically curing said flowable build material, said chemical curing resulting from the activation of chemical agents within said flowable build material.
6. The method of claim 3, wherein said solidifying said flowable build material occurs after said flowable build material has flowed to said boundary structure
7. A method for producing an object through solid freeform fabrication comprising:

selectively depositing a boundary structure with a high precision dispenser;
and

depositing a flowable object build material into said boundary structure with a low precision dispenser.

8. The method of claim 7, further comprising coupling a sparse array support structure to said boundary structure.

9. The method of claim 8, wherein said sparse array support structure comprises build material.

10. The method of claim 8, wherein said sparse array support structure is deposited with a low precision dispenser.

11. The method of claim 7, wherein said low precision dispenser and said high precision dispenser comprise a single print head.

12. The method of claim 7, wherein said depositing a flowable object build material further comprises depositing said flowable object build material in a single location within said boundary structure.

13. The method of claim 7, further comprising solidifying said flowable object build material.

14. The method of claim 13, wherein said solidifying comprises curing said object build material.

15. The method of claim 14, wherein said curing comprises exposing said object build material to ultraviolet radiation.

16. The method of claim 14, wherein said curing comprises chemically curing said object build material.

17. The method of claim 13, further comprising removing said boundary structure from said object build material after said solidification of said object build material.

18. The method of claim 17, wherein said removing said boundary structure comprises melting said boundary structure.

19. The method of claim 7, further comprising planarizing said object build material.

20. The method of claim 7, wherein said boundary structure comprises a jetted polymer.

21. The method of claim 20, wherein said jetted polymer comprises a wax.

22. The method of claim 7, wherein said flowable object build material comprises a polymer curable by ultraviolet (UV) radiation.

23. The method of claim 7, wherein said object build material comprises a wax.

24. The method of claim 7, wherein said depositing a flowable object build material comprises depositing a continuous stream of said build material.

25. The method of claim 7, wherein said depositing a flowable object build material comprises depositing discrete drops of said build material.

26. The method of claim 7, wherein said selectively depositing a boundary structure further comprises selectively depositing a cavity within said boundary structure.

27. A method of producing an object through solid freeform fabrication comprising:

selectively depositing a plurality of perimeter structures defining an outer surface of said object with a high precision dispenser; and
dispensing a volume of fluid build material interior to said perimeter structures.

28. The method of claim 27, further comprising solidifying said fluid build material.

29. The method of claim 27, wherein said dispensing a volume of fluid build material comprises adjusting said volume with a feedback control device.

30. The method of claim 29, wherein said feedback control device comprises an optical sensor.

31. The method of claim 27, wherein said dispensing a volume of fluid build material comprises ejecting said volume of fluid build material from one of a print head or a syringe.

32. The method of claim 31, wherein said ejecting comprises depositing said fluid build material in a single location within said boundary structure.

33. The method of claim 31, wherein said ejecting comprises dispensing a continuous flow.

34. The method of claim 27, further comprising planarizing said volume of fluid build material.

35. The method of claim 34, wherein said planarizing further comprises displacing a roller across said volume of fluid build material.

36. The method of claim 27, wherein said selectively depositing a plurality of perimeter structures comprises depositing a structural material in a sparse array configuration except at an interface configured to receive said volume of fluid build material.

37. A method of producing a porous object through solid freeform fabrication, said method comprising:

selectively depositing a first material with a high precision dispenser to form an outer boundary structure;

selectively depositing a smaller, internal boundary structure with said high precision dispenser; and

filling said outer boundary structure with a solidifiable build material, wherein said filling is performed by a low precision dispenser.

38. The method of claim 37, wherein said smaller, internal boundary structure is interconnected with a second internal boundary structure.

39. A method of creating a three-dimensional object with a liquid build material comprising:

selectively depositing a structural boundary, wherein said structural boundary defines a surface of said three-dimensional object;

dispensing a liquid build material into said structural boundary; and

solidifying said liquid build material.

40. The method of claim 39, wherein said structural boundary is selectively deposited with a high precision material dispenser.

41. The method of claim 39, wherein said liquid build material is dispensed by a low precision material dispenser.

42. The method of claim 39, wherein:

said structural boundary is deposited by a material dispenser operating as a high precision dispenser; and

said liquid build material is dispensed by said material dispenser operating as a low precision dispenser;

wherein said high precision dispenser and said low precision dispenser are a single print head.

43. An object created by solid freeform fabrication, said object comprising:
a plurality of bound object material including a cured material; and
a plurality of cavities disposed within said object material, said cavities formed within said bound object material by selective deposition.

44. The object of claim 43, wherein said plurality of cavities are interconnected.

45. The object of claim 44, wherein said interconnected cavities extend to a surface of said object.

46. A solid freeform fabrication apparatus comprising:
a fabrication bin;
a movable stage for distributing material in said fabrication bin; and
a material dispenser coupled to said movable stage;
wherein said material dispenser functions as a high resolution dispenser to selectively deposit a boundary structure, and said material dispenser functions as a low resolution dispenser to dispense flowable object build material into said boundary structure.

47. The apparatus of claim 46, further comprising a roller configured to planarize said material.

48. The apparatus of claim 46, wherein said material dispenser comprises an inkjet print head.

49. The apparatus of claim 46, wherein said material dispenser comprises a print head or a syringe.

50. A solid freeform fabrication apparatus comprising:
a containment means for containing fabrication materials;
a distribution means for distributing said fabrication materials in said containment means;
a high resolution material dispensing means for selectively depositing a boundary structure fabrication material; and
a low resolution material dispensing means for dispensing a flowable build material within said boundary structure fabrication material.

51. The solid freeform fabrication apparatus of claim 50, further comprising a planarizing means for planarizing said fabrication materials.

52. The solid freeform fabrication apparatus of claim 50, wherein said high resolution material dispensing means and said low resolution material dispensing means comprise a single material dispenser.

53. The solid freeform fabrication apparatus of claim 52, wherein said material dispenser comprises an inkjet printhead

54. A processor readable medium having instructions thereon for:
receiving data corresponding to a solid freeform fabrication object;
controlling a selective dispensing of material to form a boundary structure defining an outer surface of said object, wherein said material is dispensed with a high precision dispenser; and
controlling a dispensing of flowable build material into said boundary structure with a low precision dispenser to form said solid freeform fabrication object.

55. The processor readable medium of claim 54, wherein said high precision dispenser and said low precision dispenser comprise a single material dispenser.

56. The processor readable medium of claim 55, wherein said material dispenser comprises an inkjet print head.